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Otte et al.

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(54) **METHOD AND APPARATUS FOR WINDOW SIZE SELECTION TO OPTIMIZE INTER RAT HANDOVER**

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(51) **Int. Cl.**

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H04W 36/00	(2009.01)
H04W 36/14	(2009.01)
H04W 48/16	(2009.01)
H04W 88/06	(2009.01)

(52) **U.S. Cl.**

CPC ***H04W 36/0088*** (2013.01); *H04W 36/14* (2013.01); *H04W 48/16* (2013.01); *H04W 88/06* (2013.01)

(58) **Field of Classification Search**

CPC . H04W 80/04; H04W 36/18; H04W 36/0011; H04W 36/14; H04W 36/08

USPC 370/328, 329, 330, 331

See application file for complete search history.

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Assistant Examiner — Siren Wei
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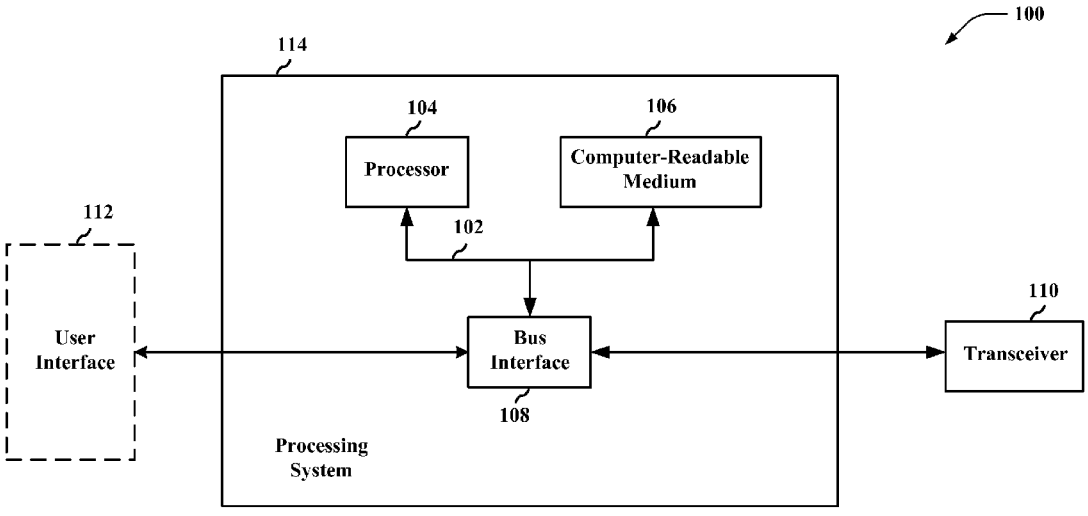
(57) **ABSTRACT**

A method, an apparatus, and a computer program product for wireless communication are provided in which a system for optimizing pilot search window size selection for inter RAT handovers is implemented. An IWS may receive a message including at least one measurement value for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE. The IWS may select one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Further the IWS may transmit the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

34 Claims, 10 Drawing Sheets



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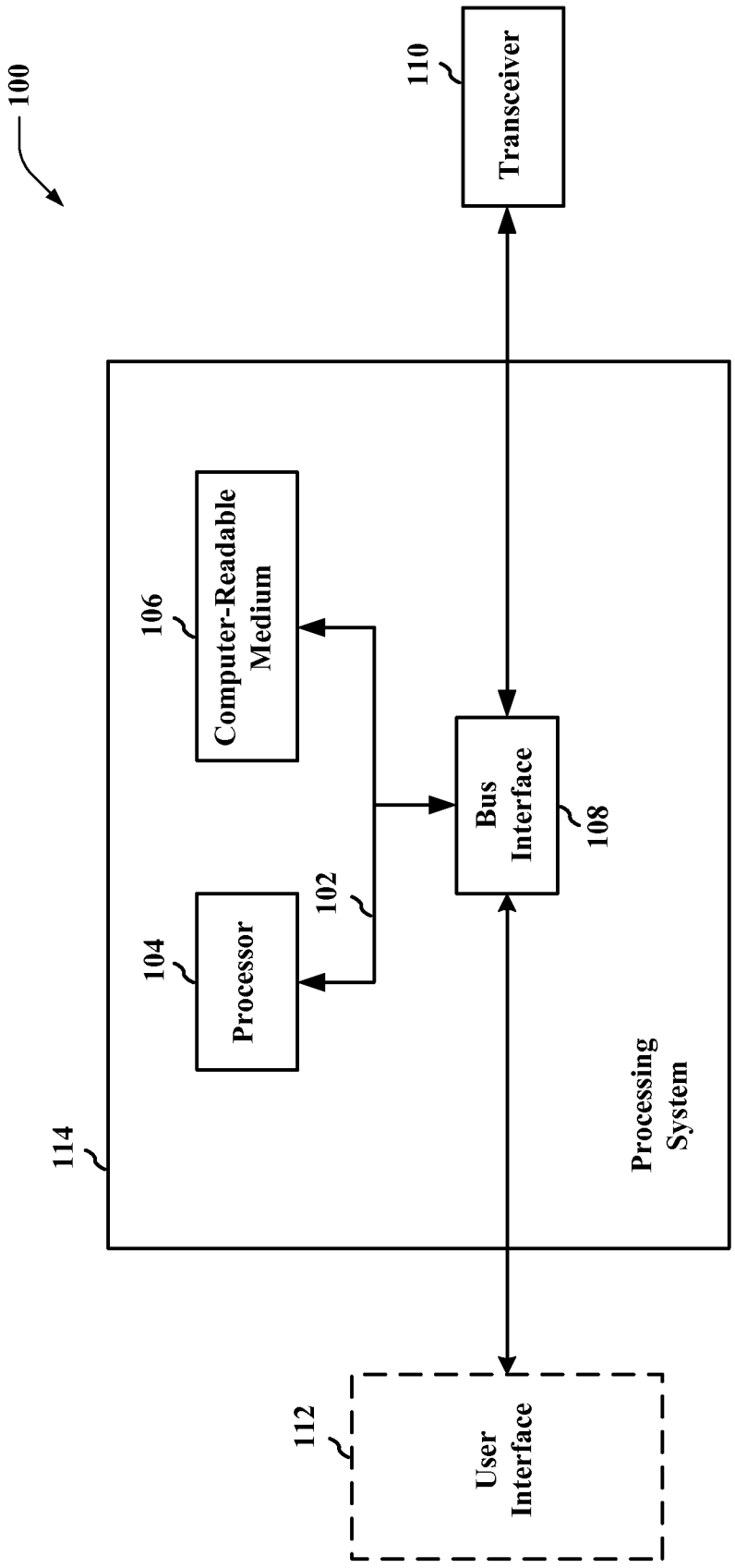
100
110
Transceiver
Computer-Readable Medium
106
Bus Interface
108
102
Processor
104
Processing System
114
User Interface
112

FIG. 1

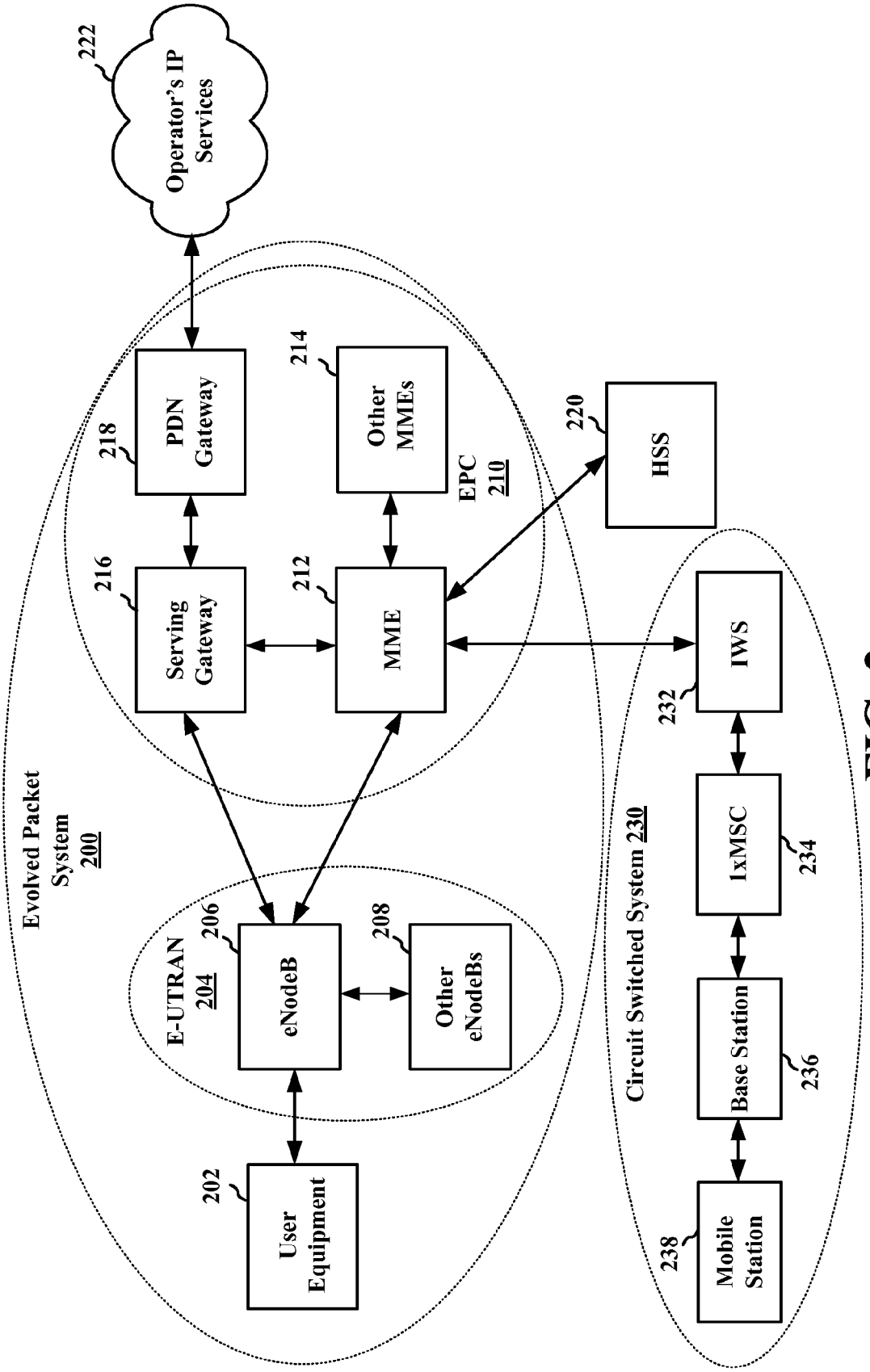
222
Operator's IP Services
218
PDN Gateway
214
Other MMEs
EPC 210
220
HSS
216
Serving Gateway
212
MME
232
IWS
Evolved Packet System 200
Circuit Switched System 230
E-UTRAN 204
206
eNodeB
208
Other eNodeBs
1xMSC
234
Base Station
236
202
User Equipment
238
Mobile Station

FIG. 2

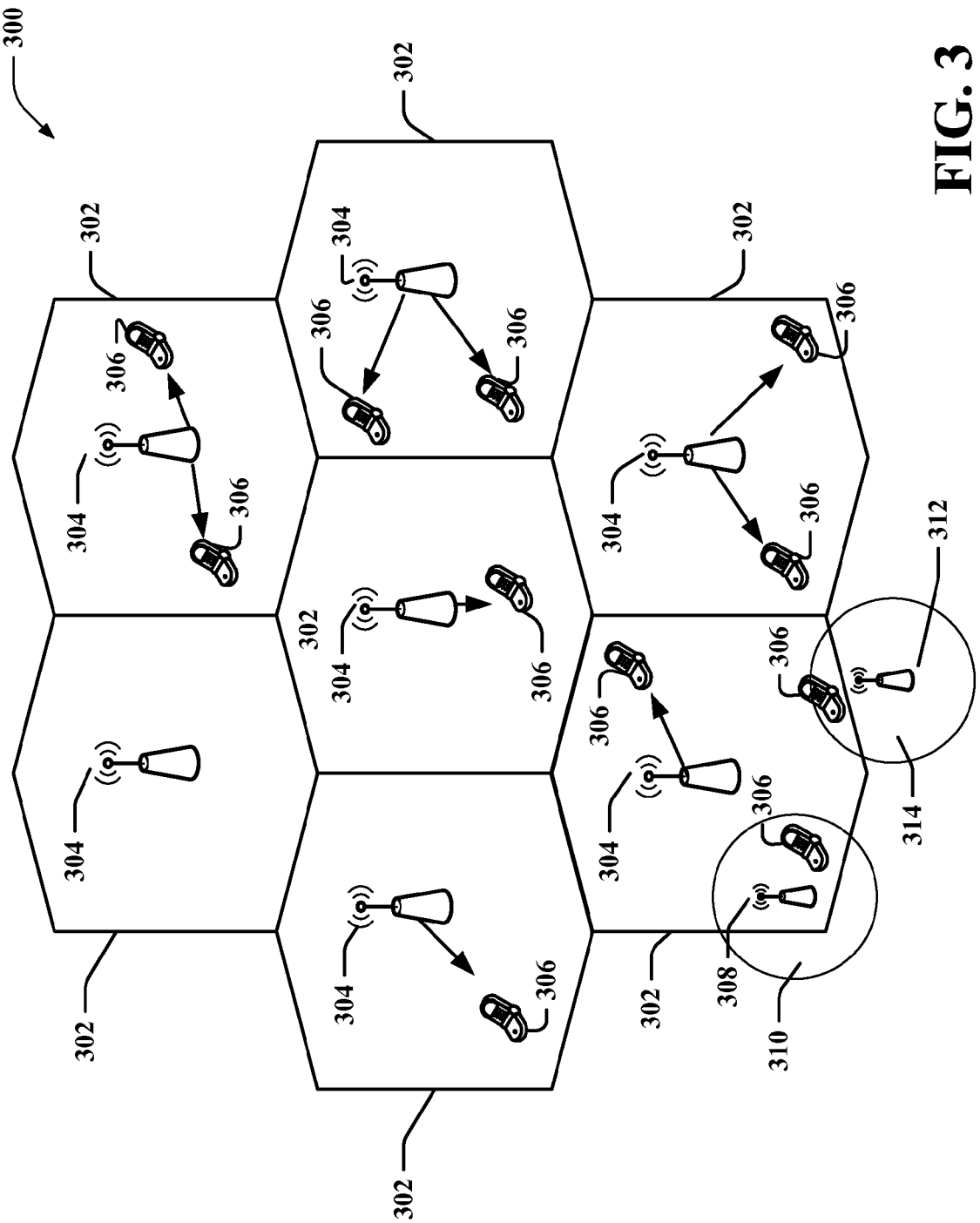

FIG. 3

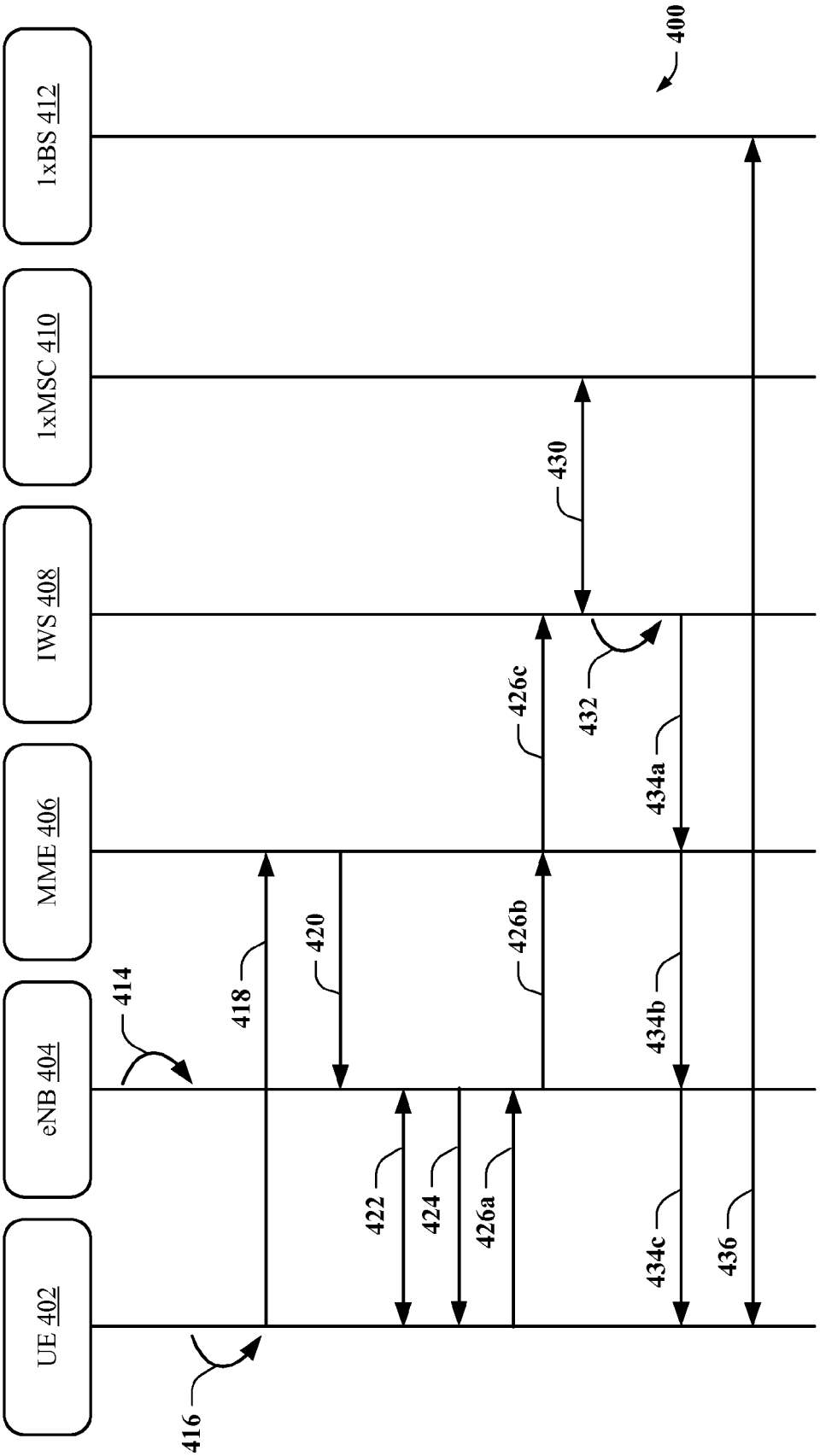
400
1xBS 412
1xMSC 410
IWS 408
MME 406
eNB 404
UE 402
414
416
418
420
422
424
426a
426b
426c
430
432
434a
434b
434c
436

FIG. 4

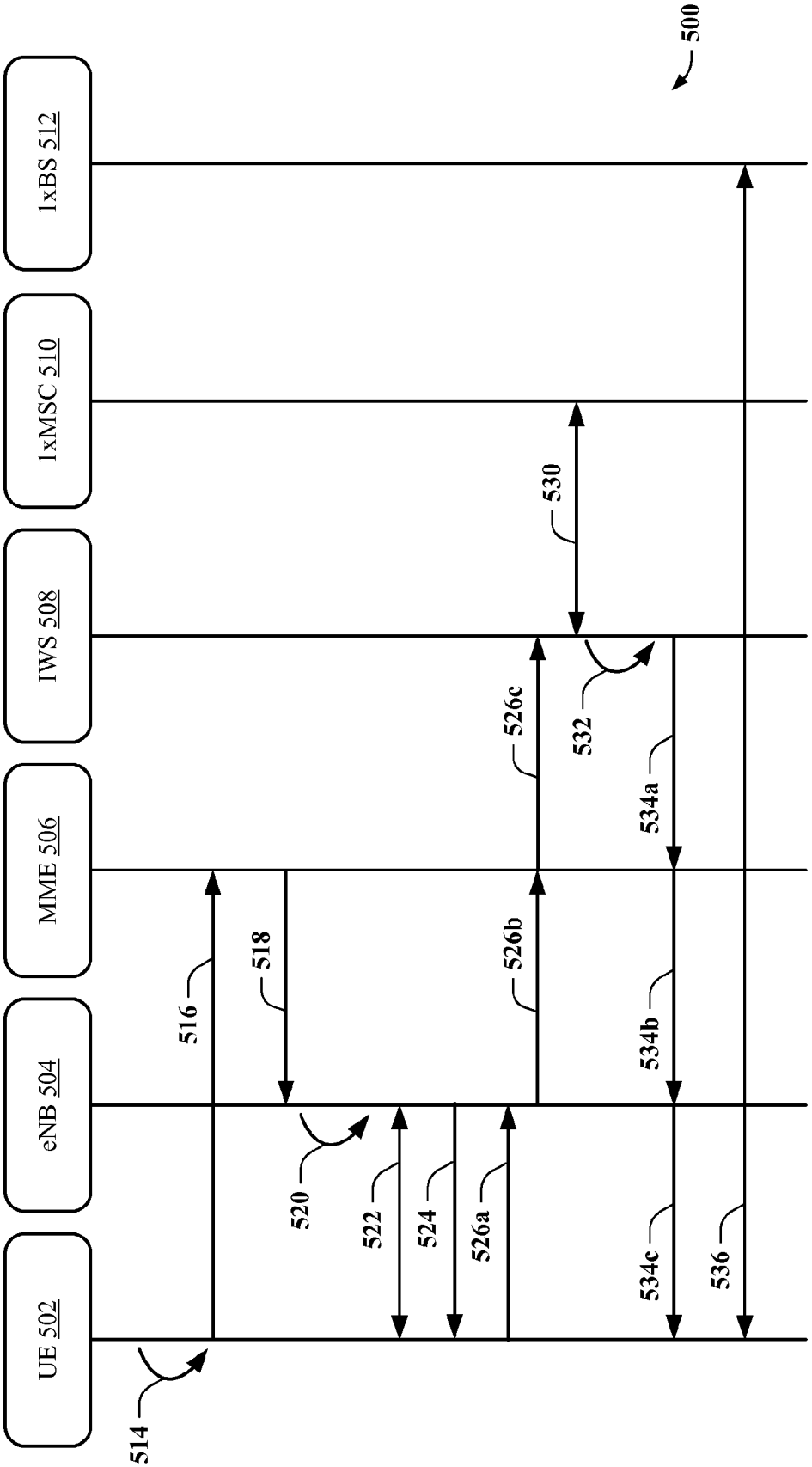
500
UE 502
eNB 504
MME 506
IWS 508
1xMSC 510
1xBS 512
514
516
518
520
522
524
526a
526b
526c
530
532
534a
534b
534c
536

FIG. 5

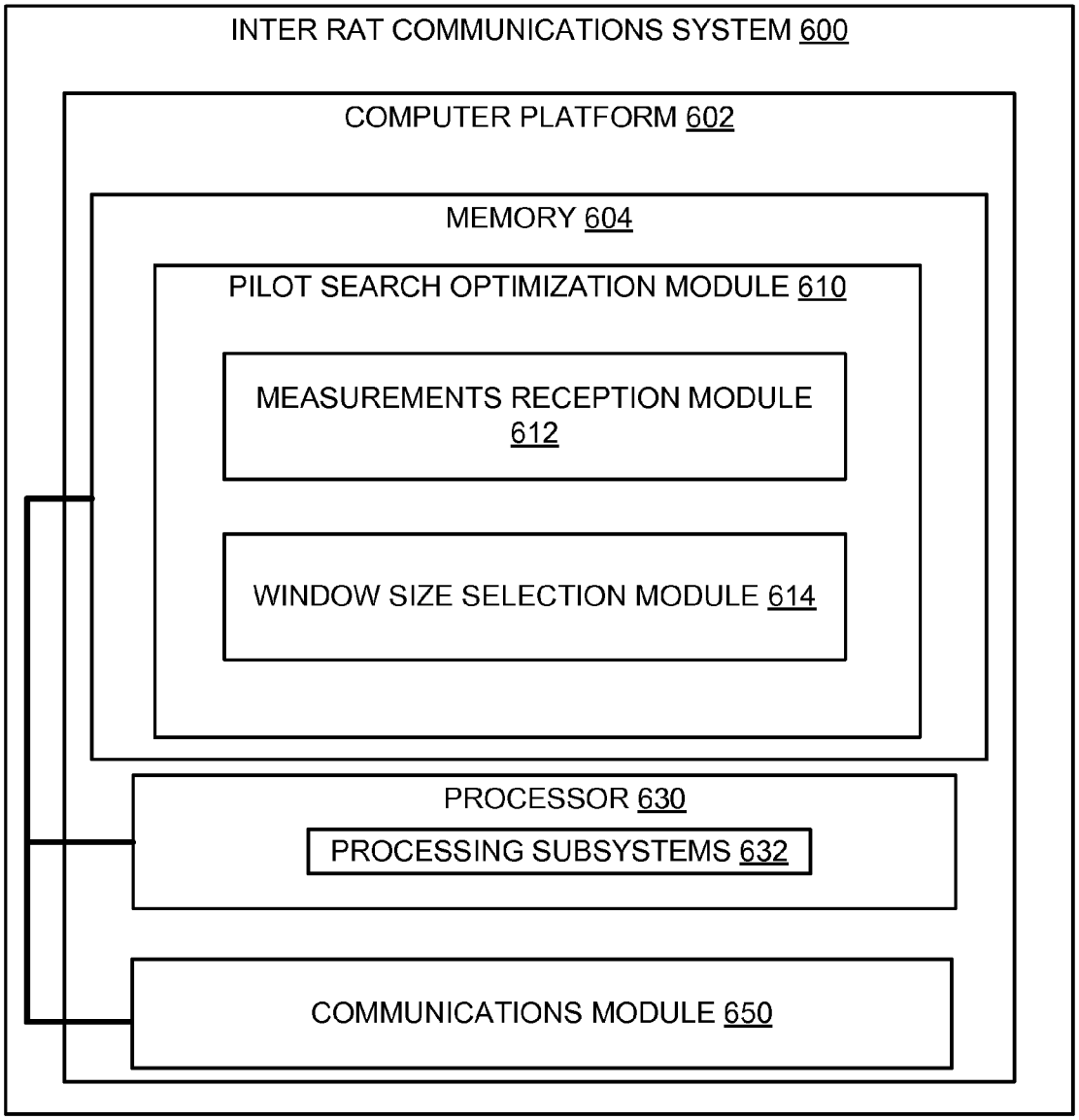
INTER RAT COMMUNICATIONS SYSTEM 600
COMPUTER PLATFORM 602
MEMORY 604
PILOT SEARCH OPTIMIZATION MODULE 610
MEASUREMENTS RECEPTION MODULE 612
WINDOW SIZE SELECTION MODULE 614
PROCESSOR 630
PROCESSING SUBSYSTEMS 632
COMMUNICATIONS MODULE 650

FIG. 6

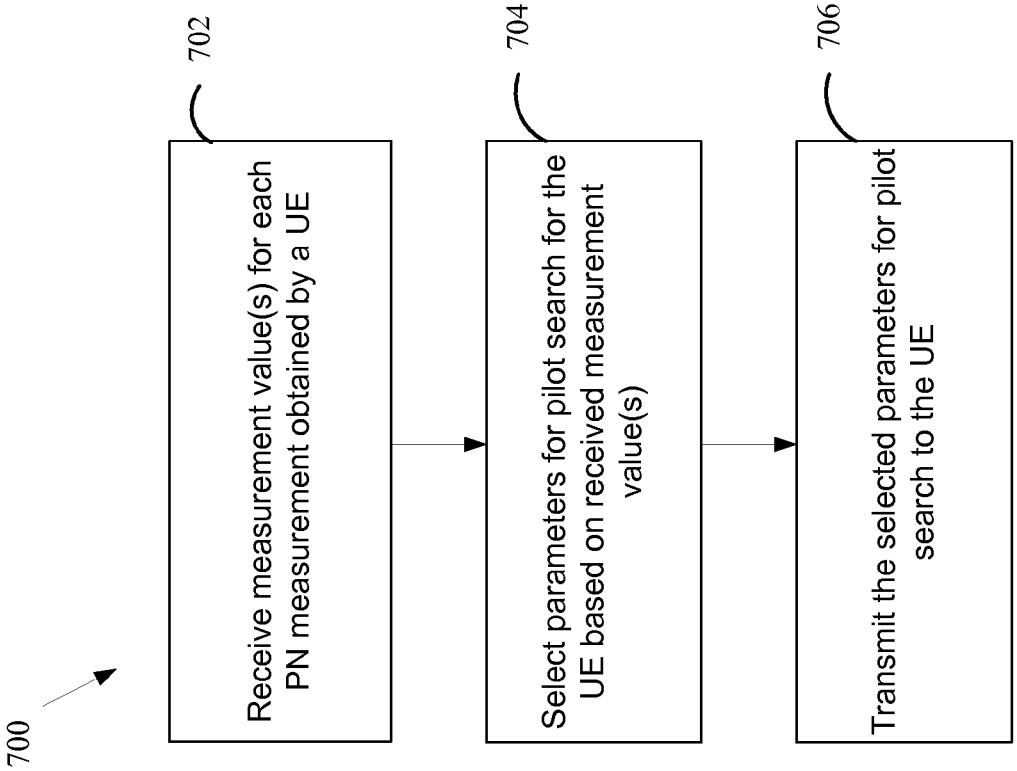
700
702
Receive measurement value(s) for each PN measurement obtained by a UE
704
Select parameters for pilot search for the UE based on received measurement value(s)
706
Transmit the selected parameters for pilot search to the UE

FIG. 7

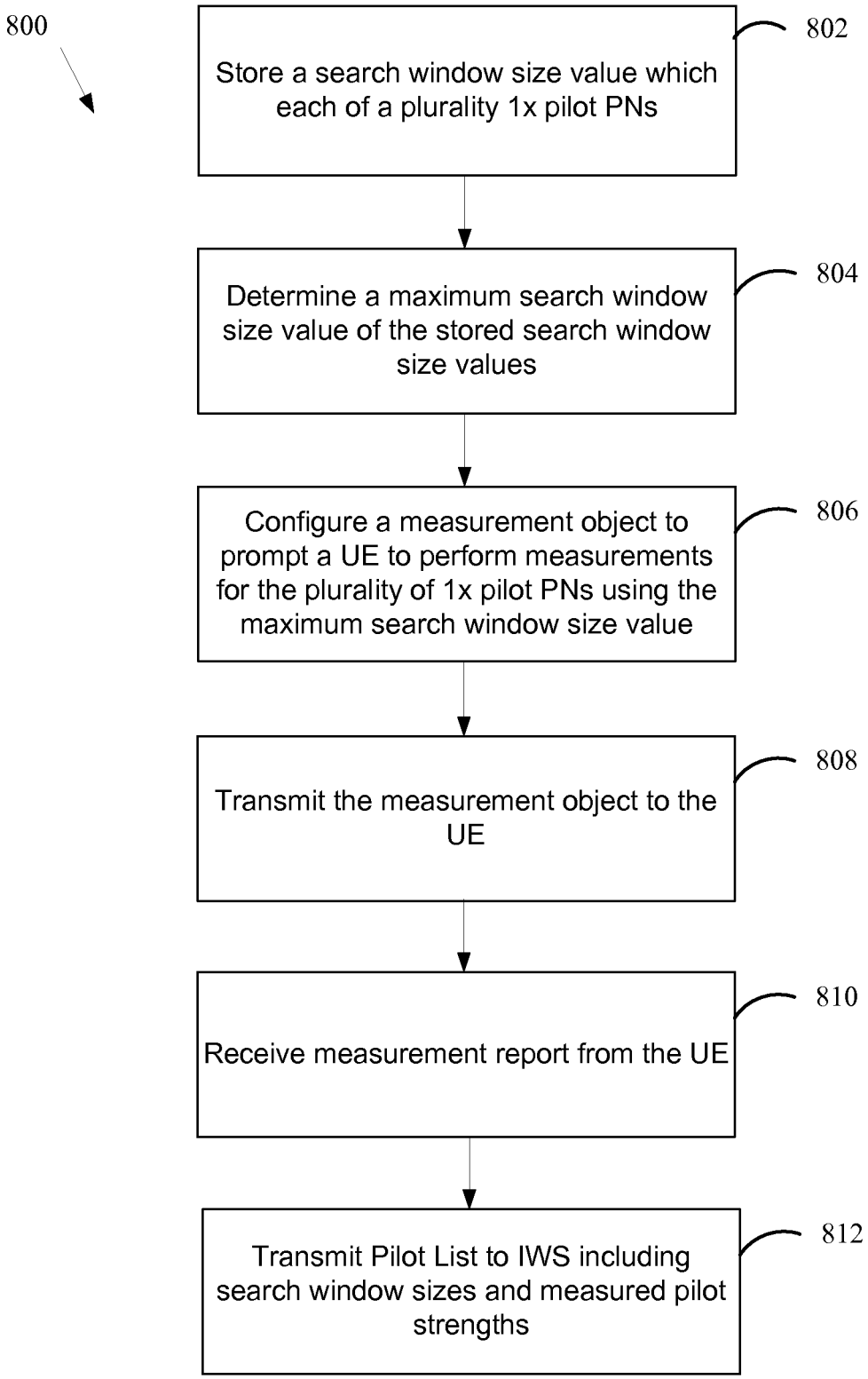
800
Store a search window size value which each of a plurality 1x pilot PNs
802
Determine a maximum search window size value of the stored search window size values
804
Configure a measurement object to prompt a UE to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value
806
Transmit the measurement object to the UE
808
Receive measurement report from the UE
810
Transmit Pilot List to IWS including search window sizes and measured pilot strengths
812

FIG. 8

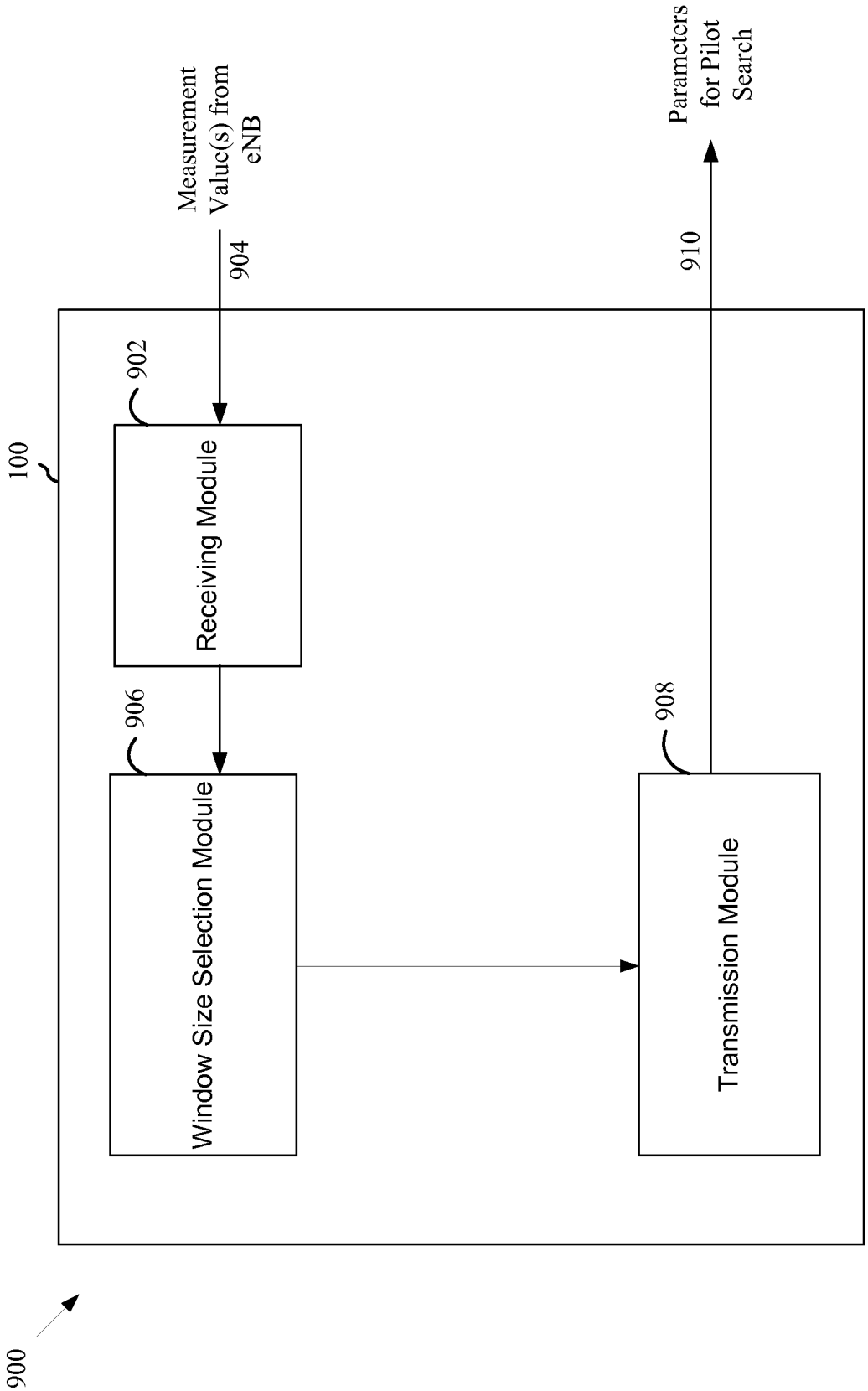
900
100
902
Receiving Module
904
Measurement Value(s) from eNB
906
Window Size Selection Module
908
Transmission Module
910
Parameters for Pilot Search

FIG. 9

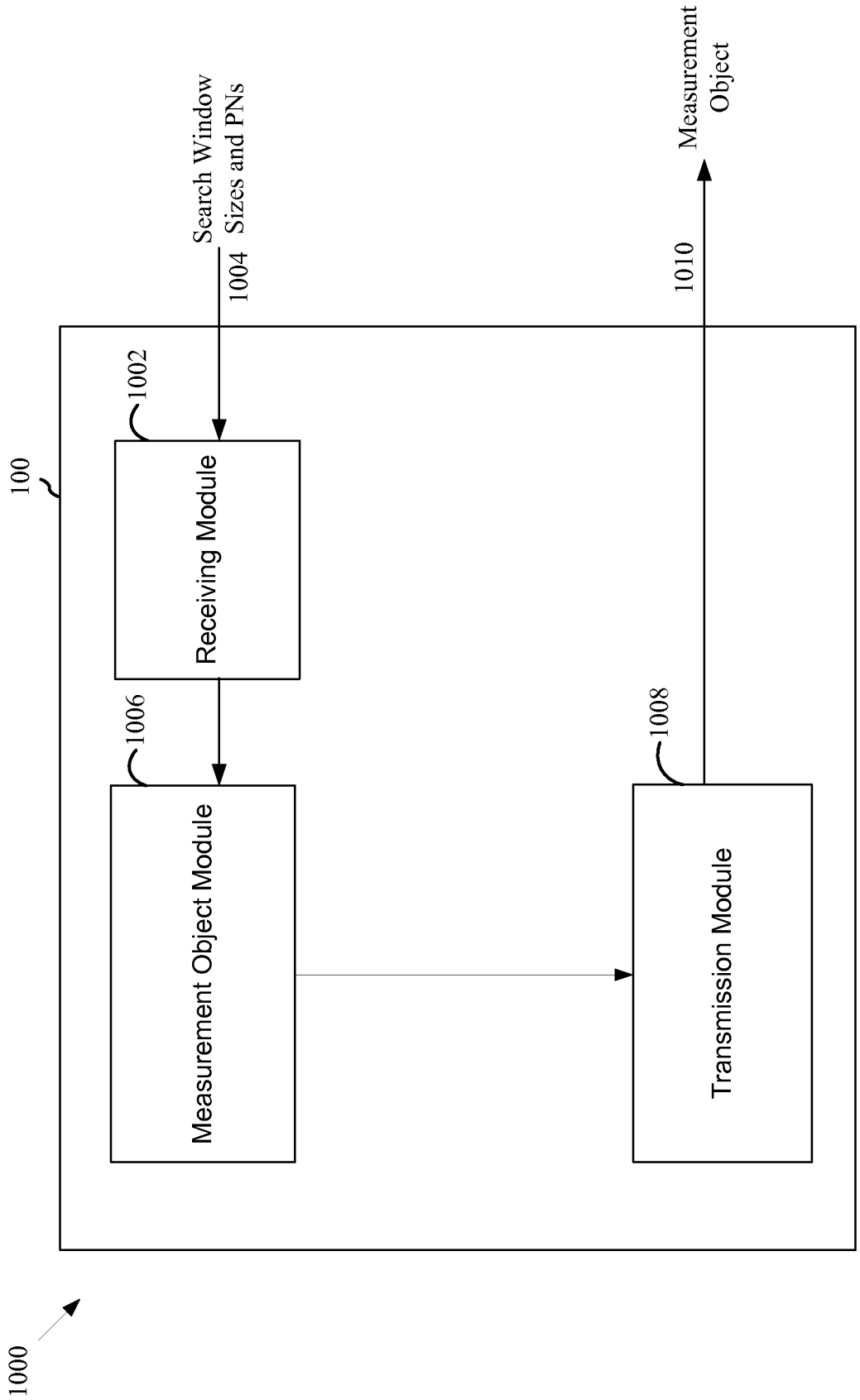
1000
100
1002
Receiving Module
1004
Search Window Sizes and PNs
1006
Measurement Object Module
1008
Transmission Module
1010
Measurement Object

FIG. 10

METHOD AND APPARATUS FOR WINDOW SIZE SELECTION TO OPTIMIZE INTER RAT HANDOVER

CROSS-REFERENCE TO RELATED APPLICATION(S)

This application claims the benefit of U.S. Provisional Application Ser. No. 61/373,352, entitled "A Method and Apparatus for Pilot Search Window Size Determination in Traffic Channel Assignment Process for Inter RAT Handover" and filed on Aug. 13, 2010, and U.S. Provisional Application Ser. No. 61/379,079, entitled "A Method and Apparatus for Pilot Search Window Size Determination in Traffic Channel Assignment Process for Inter RAT Handover" and filed on Sep. 1, 2010, which are expressly incorporated by reference herein in its entirety.

BACKGROUND

1. Field

The present disclosure relates generally to communication systems, and more particularly, to a system and method to optimize pilot search window size selection during inter radio access technology (RAT) communications.

2. Background

Wireless communication systems are widely deployed to provide various telecommunication services such as telephony, video, data, messaging, and broadcasts. Typical wireless communication systems may employ multiple-access technologies capable of supporting communication with multiple users by sharing available system resources (e.g., bandwidth, transmit power). Examples of such multiple-access technologies include code division multiple access (CDMA) systems, time division multiple access (TDMA) systems, frequency division multiple access (FDMA) systems, orthogonal frequency division multiple access (OFDMA) systems, single-carrier frequency divisional multiple access (SC-FDMA) systems, and time division synchronous code division multiple access (TD-SCDMA) systems.

These multiple access technologies have been adopted in various telecommunication standards to provide a common protocol that enables different wireless devices to communicate on a municipal, national, regional, and even global level. An example of an emerging telecommunication standard is Long Term Evolution (LTE). LTE is a set of enhancements to the Universal Mobile Telecommunications System (UMTS) mobile standard promulgated by Third Generation Partnership Project (3GPP). It is designed to better support mobile broadband Internet access by improving spectral efficiency, lower costs, improve services, make use of new spectrum, and better integrate with other open standards using OFDMA on the downlink (DL), SC-FDMA on the uplink (UL), and multiple-input multiple-output (MIMO) antenna technology. However, as the demand for mobile broadband access continues to increase, there exists a need for further improvements in LTE technology. Preferably, these improvements should be applicable to other multi-access technologies and the telecommunication standards that employ these technologies.

SUMMARY

The following presents a simplified summary of one or more aspects in order to provide a basic understanding of such aspects. This summary is not an extensive overview of all contemplated aspects, and is intended to neither identify key or critical elements of all aspects nor delineate the scope of any or all aspects. Its sole purpose is to present some concepts of one or more aspects in a simplified form as a prelude to the more detailed description that is presented later.

In accordance with one or more aspects and corresponding disclosure thereof, various aspects are described in relation to optimizing pilot search window size selection during inter RAT communications. According to one aspect, a method in wireless communications is provided. The method can include receiving, by an interworking solution (IWS), a message including at least one measurement value for each 1x pilot pseudo-noise (PN) in a 1x network, obtained from measurements requested by an evolved nodeB (eNB) and performed by a user equipment (UE). Further, the method can include selecting one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Moreover, the method can include transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

Another aspect relates to an apparatus. The apparatus can include a processing system configured to receive, by an IWS, a message including at least one measurement value for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE. Further, the processing system may be configured to select one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Moreover, the processing system may be configured to transmit the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

Another aspect relates to a computer program product comprising a computer-readable medium. The computer-readable medium comprising code for receiving, by an IWS, a message including at least one measurement value for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE. Further, the computer-readable medium may comprise code for selecting one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Moreover, the computer-readable medium may comprise code for transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

Yet another aspect relates to an apparatus. The apparatus may comprise means for receiving, by an IWS, a message including at least one measurement value for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE. Further, the apparatus may include means for selecting one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Moreover, the apparatus may include means for transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

To the accomplishment of the foregoing and related ends, the one or more aspects comprise the features hereinafter fully described and particularly pointed out in the claims. The following description and the annexed drawings set forth in detail certain illustrative features of the one or more aspects. These features are indicative, however, of but a few of the various ways in which the principles of various aspects may be employed, and this description is intended to include all such aspects and their equivalents.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosed aspects will hereinafter be described in conjunction with the appended drawings, provided to illustrate

and not to limit the disclosed aspects, wherein like designations denote like elements, and in which:

FIG. **1** is a diagram illustrating an example of a hardware implementation for an apparatus employing a processing system;

FIG. **2** is a diagram illustrating an example of a network architecture;

FIG. **3** is a diagram illustrating an example of an access network;

FIG. **4** is a call flow diagram describing an example system for optimizing pilot search window size selection for inter RAT communications according to an aspect;

FIG. **5** is a call flow diagram describing another example system for optimizing pilot search window size selection for inter RAT communications according to an aspect;

FIG. **6** is an example block diagram of an inter RAT communications system according to an aspect;

FIG. **7** is a flow chart of a method of wireless communication;

FIG. **8** is a flow chart of another method of wireless communication;

FIG. **9** is a conceptual block diagram illustrating the functionality of an example apparatus; and

FIG. **10** is a conceptual block diagram illustrating the functionality of another example apparatus.

DETAILED DESCRIPTION

The detailed description set forth below in connection with the appended drawings is intended as a description of various configurations and is not intended to represent the only configurations in which the concepts described herein may be practiced. The detailed description includes specific details for the purpose of providing a thorough understanding of various concepts. However, it will be apparent to those skilled in the art that these concepts may be practiced without these specific details. In some instances, well known structures and components are shown in block diagram form in order to avoid obscuring such concepts.

Several aspects of telecommunication systems will now be presented with reference to various apparatus and methods. These apparatus and methods will be described in the following detailed description and illustrated in the accompanying drawing by various blocks, modules, components, circuits, steps, processes, algorithms, etc. (collectively referred to as "elements"). These elements may be implemented using electronic hardware, computer software, or any combination thereof. Whether such elements are implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system.

By way of example, an element, or any portion of an element, or any combination of elements may be implemented with a "processing system" that includes one or more processors. Examples of processors include microprocessors, microcontrollers, digital signal processors (DSPs), field programmable gate arrays (FPGAs), programmable logic devices (PLDs), state machines, gated logic, discrete hardware circuits, and other suitable hardware configured to perform the various functionality described throughout this disclosure. One or more processors in the processing system may execute software. Software shall be construed broadly to mean instructions, instruction sets, code, code segments, program code, programs, subprograms, software modules, applications, software applications, software packages, routines, subroutines, objects, executables, threads of execution, procedures, functions, etc., whether referred to as software, firmware, middleware, microcode, hardware description language, or otherwise.

Accordingly, in one or more exemplary embodiments, the functions described may be implemented in hardware, software, firmware, or any combination thereof. If implemented in software, the functions may be stored on or encoded as one or more instructions or code on a computer-readable medium. Computer-readable media includes computer storage media. Storage media may be any available media that can be accessed by a computer. By way of example, and not limitation, such computer-readable media can comprise RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to carry or store desired program code in the form of instructions or data structures and that can be accessed by a computer. Disk and disc, as used herein, includes compact disc (CD), laser disc, optical disc, digital versatile disc (DVD), floppy disk and Blu-ray disc where disks usually reproduce data magnetically, while discs reproduce data optically with lasers. Combinations of the above should also be included within the scope of computer-readable media.

FIG. **1** is a conceptual diagram illustrating an example of a hardware implementation for an apparatus **100** employing a processing system **114**. In this example, the processing system **114** may be implemented with a bus architecture, represented generally by the bus **102**. The bus **102** may include any number of interconnecting buses and bridges depending on the specific application of the processing system **114** and the overall design constraints. The bus **102** links together various circuits including one or more processors, represented generally by the processor **104**, and computer-readable media, represented generally by the computer-readable medium **106**. The bus **102** may also link various other circuits such as timing sources, peripherals, voltage regulators, and power management circuits, which are well known in the art, and therefore, will not be described any further. A bus interface **108** provides an interface between the bus **102** and a transceiver **110**. The transceiver **110** provides a means for communicating with various other apparatus over a transmission medium. Depending upon the nature of the apparatus, a user interface **112** (e.g., keypad, display, speaker, microphone, joystick) may also be provided.

The processor **104** is responsible for managing the bus **102** and general processing, including the execution of software stored on the computer-readable medium **106**. The software, when executed by the processor **104**, causes the processing system **114** to perform the various functions described infra for any particular apparatus. The computer-readable medium **106** may also be used for storing data that is manipulated by the processor **104** when executing software.

FIG. **2** is a diagram illustrating an Enhanced Packet System architecture **200** employing various apparatuses **100** (See FIG. **1**). The EPS **200** may include one or more user equipment (UE) **202**, an Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) **204**, an Evolved Packet Core (EPC) **210**, a Home Subscriber Server (HSS) **220**, and an Operator's IP Services **222**. The EPS can interconnect with other access networks, such as a circuit switched network **230**. As shown, the EPS provides packet-switched services, however, as those skilled in the art will readily appreciate, the various concepts presented throughout this disclosure may be extended to networks providing circuit-switched services.

The E-UTRAN includes the evolved Node B (eNB) **206** and other eNBs **208**. The eNB **206** provides user and control plane protocol terminations toward the UE **202**. The eNB **206**

may be connected to the other eNBs **208** via an X2 interface (i.e., backhaul). The eNB **206** may also be referred to by those skilled in the art as a base station, a base transceiver station, a radio base station, a radio transceiver, a transceiver function, a basic service set (BSS), an extended service set (ESS), or some other suitable terminology. The eNB **206** provides an access point to the EPC **210** for a UE **202**. Examples of UEs **202** include a cellular phone, a smart phone, a session initiation protocol (SIP) phone, a laptop, a personal digital assistant (PDA), a satellite radio, a global positioning system, a multimedia device, a video device, a digital audio player (e.g., MP3 player), a camera, a game console, or any other similar functioning device. The UE **202** may also be referred to by those skilled in the art as a mobile station, a subscriber station, a mobile unit, a subscriber unit, a wireless unit, a remote unit, a mobile device, a wireless device, a wireless communications device, a remote device, a mobile subscriber station, an access terminal, a mobile terminal, a wireless terminal, a remote terminal, a handset, a user agent, a mobile client, a client, or some other suitable terminology.

The eNB **206** is connected by an S1 interface to the EPC **210**. The EPC **210** includes a Mobility Management Entity (MME) **212**, other MMEs **214**, a Serving Gateway **216**, and a Packet Data Network (PDN) Gateway **218**. The MME **212** is the control node that processes the signaling between the UE **202** and the EPC **210**. Generally, the MME **212** provides bearer and connection management. All user IP packets are transferred through the Serving Gateway **216**, which itself is connected to the PDN Gateway **218**. The PDN Gateway **218** provides UE IP address allocation as well as other functions. The PDN Gateway **218** is connected to the Operator's IP Services **222**. The Operator's IP Services **222** include the Internet, the Intranet, an IP Multimedia Subsystem (IMS), and a PS Streaming Service (PSS).

The circuit switched system **230** includes an interworking solution (IWS) **232**, a mobility switching center (MSC) **234**, a base station **236**, and a mobile station **238**. In one aspect, circuit switched system **230** may communicate with EPS **200** through the IWS **232** and MME **212**. FIGS. **4** and **5** discuss various operational processes in which the circuit switched system **230** may communicate with the EPS **200**. In one aspect, handover of the UE **202** may occur between the circuit switched system **230** and the EPS **200**. In one aspect, such handover may be associated with 1x circuit switch fallback (1xCSFB). In another aspect, the similar processes discussed in FIGS. **4** and **5** may be applicable to inter RAT communications for an evolved high rate packet data (eHRPD) optimized handover.

Generally in Circuit Switched System **230**, Mobile Station **238** uses a pilot search window size provided from the Base Station **236**. If the window size is large, the possibility of finding the best pilot could be increased, but such a window sizing may result in unnecessarily long times and as such, prolong a call set up time. Window size may be optimized based on various factors associated with the radio environment, e.g., the size of cell, delay spread of radio propagation, repeaters existence, etc. Optimization factors may be deferent in each cell site. In a 1x Circuit Switch Fall Back (1xCSFB) procedure, the IWS **232** may pick up Pilot PN for channel assignment based on the measurement report from the UE **202**. In one aspect, the IWS **232** may be co-located with 1xBSC **236**, or a standalone entity. If the IWS **232** is collocated with the 1xBSC **236**, the IWS may determine window sizes for cell sites which are associated with 1xBSC **236**. However, if IWS **232** is a standalone entity, the search window size of each 1x base station **236** may not be configured in IWS **232**. Further, a window size selection is made before UE **202** tunes to the circuit switched system **230** to acquire a 1x traffic channel. Several ways to obtain the window size include, use of a parameter in SIB8, use of a measurement object in RRC Connection Reconfiguration, use of a cdma2000 parameters message, use of a 1x channel assignment message (UHDM), etc. Some of these options are managed by the eNB **204**. In these options, the largest window size among PNs covered by the eNB **204** may be selected because only one value can be included. Other options are managed by IWS **232**. In one aspect, window size values provided by eNB **204** and IWS **232** may not be in synchronization because keeping synchronization may be a burdensome operation. As such, the UE **202** may not be provided with the optimized window size for a channel. In other words, if the eNB **204** and IWS **232** are not in sync, the window size set by eNB **204** may not be the optimized for a channel assigned by IWS **232**. Various schemes to optimize pilot search window size selection for inter RAT communications are discussed in detail with respect to FIGS. **4** and **5**.

FIG. **3** is a diagram illustrating an example of an access network in an LTE network architecture. In this example, the access network **300** is divided into a number of cellular regions (cells) **302**. One or more lower power class eNBs **308**, **312** may have cellular regions **310**, **314**, respectively, that overlap with one or more of the cells **302**. The lower power class eNBs **308**, **312** may be femto cells (e.g., home eNBs (HeNBs)), pico cells, or micro cells. A higher power class or macro eNB **304** is assigned to a cell **302** and is configured to provide an access point to the EPC **210** for all the UEs **306** in the cell **302**. There is no centralized controller in this example of an access network **300**, but a centralized controller may be used in alternative configurations. The eNB **304** is responsible for all radio related functions including radio bearer control, admission control, mobility control, scheduling, security, and connectivity to the serving gateway **216** (see FIG. **2**).

The modulation and multiple access scheme employed by the access network **300** may vary depending on the particular telecommunications standard being deployed. In LTE applications, OFDM is used on the DL and SC-FDMA is used on the UL to support both frequency division duplexing (FDD) and time division duplexing (TDD). As those skilled in the art will readily appreciate from the detailed description to follow, the various concepts presented herein are well suited for LTE applications. However, these concepts may be readily extended to other telecommunication standards employing other modulation and multiple access techniques. By way of example, these concepts may be extended to Evolution-Data Optimized (EV-DO) or Ultra Mobile Broadband (UMB). EV-DO and UMB are air interface standards promulgated by the 3rd Generation Partnership Project 2 (3GPP2) as part of the CDMA2000 family of standards and employs CDMA to provide broadband Internet access to mobile stations. These concepts may also be extended to Universal Terrestrial Radio Access (UTRA) employing Wideband-CDMA (W-CDMA) and other variants of CDMA, such as TD-SCDMA; Global System for Mobile Communications (GSM) employing TDMA; and Evolved UTRA (E-UTRA), Ultra Mobile Broadband (UMB), IEEE 802.11 (Wi-Fi), IEEE 802.16 (WiMAX), IEEE 802.20, and Flash-OFDM employing OFDMA. UTRA, E-UTRA, UMTS, LTE and GSM are described in documents from the 3GPP organization. CDMA2000 and UMB are described in documents from the 3GPP2 organization. The actual wireless communication standard and the multiple access technology employed will depend on the specific application and the overall design constraints imposed on the system.

The eNB **304** may have multiple antennas supporting MIMO technology. The use of MIMO technology enables the eNB **304** to exploit the spatial domain to support spatial multiplexing, beamforming, and transmit diversity.

Spatial multiplexing may be used to transmit different streams of data simultaneously on the same frequency. The data steams may be transmitted to a single UE **306** to increase the data rate or to multiple UEs **306** to increase the overall system capacity. This is achieved by spatially precoding each data stream (i.e., applying a scaling of an amplitude and a phase) and then transmitting each spatially precoded stream through multiple transmit antennas on the downlink. The spatially precoded data streams arrive at the UE(s) **306** with different spatial signatures, which enables each of the UE(s) **306** to recover the one or more data streams destined for that UE **306**. On the uplink, each UE **306** transmits a spatially precoded data stream, which enables the eNB **304** to identify the source of each spatially precoded data stream.

Spatial multiplexing is generally used when channel conditions are good. When channel conditions are less favorable, beamforming may be used to focus the transmission energy in one or more directions. This may be achieved by spatially precoding the data for transmission through multiple antennas. To achieve good coverage at the edges of the cell, a single stream beamforming transmission may be used in combination with transmit diversity.

In the detailed description that follows, various aspects of an access network will be described with reference to a MIMO system supporting OFDM on the downlink. OFDM is a spread-spectrum technique that modulates data over a number of subcarriers within an OFDM symbol. The subcarriers are spaced apart at precise frequencies. The spacing provides "orthogonality" that enables a receiver to recover the data from the subcarriers. In the time domain, a guard interval (e.g., cyclic prefix) may be added to each OFDM symbol to combat inter-OFDM-symbol interference. The uplink may use SC-FDMA in the form of a DFT-spread OFDM signal to compensate for high peak-to-average power ratio (PAPR).

FIGS. **4**, **5**, and **7** illustrate various methodologies in accordance with various aspects of the presented subject matter. While, for purposes of simplicity of explanation, the methodologies are shown and described as a series of acts or sequence steps, it is to be understood and appreciated that the claimed subject matter is not limited by the order of acts, as some acts may occur in different orders and/or concurrently with other acts from that shown and described herein. For example, those skilled in the art will understand and appreciate that a methodology could alternatively be represented as a series of interrelated states or events, such as in a state diagram. Moreover, not all illustrated acts may be required to implement a methodology in accordance with the claimed subject matter. Additionally, it should be further appreciated that the methodologies disclosed hereinafter and throughout this specification are capable of being stored on an article of manufacture to facilitate transporting and transferring such methodologies to computers. The term article of manufacture, as used herein, is intended to encompass a computer program accessible from any computer-readable device, carrier, or media.

Generally, with respect to FIGS. **4** and **5**, communications between a UE and an eNB may be supported using an LTE RAT with uplink and downlink information transfer. Further, communications between the eNB and a MME may be supported through an S1 interface and may provide for S1 cdma2000 tunneling. Still further, communications between the MME and an IWS may be supported through an S102 interface and may provide for A21 interface signaling.

FIG. **4** illustrates a call flow diagram flowchart describing a system **400** for providing optimal window sizing for inter RAT communications. System **400** includes a UE **402**, such as UE **202**, eNB **404**, such as eNB **206**, MME **406**, such as MME **212**, IWS **408**, such as IWS **232**, 1xMSC **410**, such as 1xMSC **234**, and a 1xBS **412** such as base station **236**.

At act **414**, eNB **404** may store search window sizes for 1x pilot PNs. At act **416**, a voice call may be originated by UE **402**. In response to the voice call origination, UE **402** may communicate with MME **406** and perform an extended service request at act **418**. At act **420**, MME **406** performs initial context setup, for example, for 1x CSFB. At act **422**, UE **402** performs measurements and reports the measurement results to eNB **404**. In one aspect, eNB **404** may set the window sizes among PNs stored at act **414** to maximum values in the measurement object.

At act **424**, eNB **404** transmits a handover preparation request to UE **402**. At acts **426***b* and **426***c* search window information is transmitted to IWS **408**. In one aspect, where the 1x pilot measurement is performed for 1xCSFB, UE **402** communicates the 1x pilot measurement results in a Pilot List information element (IE). When eNB **404** sends the Pilot List IE in UL C2K Tunneling message, eNB **404** includes the window size stored at act **414** for each Pilot associated with reported PN in the Pilot List IE. At act **430**, IWS **408** communicates with 1xMSC **410** to setup the handover. In one aspect, such communications include a service request transmission to 1xMSC **410** and an assignment request from 1xMSC **410** to IWS **408**.

At act **432**, IWS **408** determines search window values. In one aspect, when IWS **408** assigns a channel or channels, it determines the window sizes based on the information provided by eNB **404**. At acts **434***a*, **434***b*, and **434***c* the window size values are communicated to UE **402**. In one aspect, IWS **408** communicates the window sizes (e.g., search window for active and candidate set, search window for neighbor set, search window for remaining set, etc.) in the 1x Universal Handoff Direction Message (UHDM) along with assigned PN(s). At act **436**, UE **402** communicates with 1xBS **412** using the search window size in UHDM according to 1x native operations.

FIG. **5** illustrates a call flow diagram flowchart describing a system **500** for providing optimal window sizing for inter RAT communications. System **500** includes a UE **502**, such as UE **202**, eNB **504**, such as eNB **206**, MME **506**, such as MME **212**, IWS **508**, such as IWS **232**, 1xMSC **510**, such as 1xMSC **234**, and a 1xBS **512** such as base station **236**.

At act **514**, a voice call may be originated by UE **502**. In response to the voice call origination, UE **502** may communicate with MME **506** and perform an extended service request at act **516**. At act **518**, MME **506** performs initial context setup, for example, for 1x CSFB.

At act **520**, eNB **504** may configure a measurement object to prompt the UE report both Pilot Strength and Pilot PN Phase in the measurement report. At act **522**, UE **502** performs measurements and reports the measurement results to eNB **504**.

At act **524**, eNB **504** transmits a handover preparation request to UE **502**. At acts **526***b* and **526***c* pilot PN phase information is transmitted to IWS **508**. In one aspect, at act **526***a*, eNB **504** receives the UL handover preparation transfer containing GCSNA encapsulated 1x Origination Message, then at acts **526***b* and **526***c* the GCSNA encapsulated 1x Origination Message is forwarded, along with the measurement results (e.g., A21 Pilot List IE). The A21 Pilot List IE includes the measured Pilot Strength and Pilot PN phase for each PN. At act **530**, IWS **508** communicates with 1xMSC

510 to setup the handover. In one aspect, such communications include a service request transmission to 1xMSC **510** and an assignment request from 1xMSC **510** to IWS **508**.

At act **532**, IWS **508** determines search offset values. In one aspect, IWS **508** determines the search offset values (e.g., SRCH_OFFSET) based on the reported Pilot PN Phase as appropriate. For example, SRCH_OFFSET may be set if the peak phase of a measured pilot exceeds a threshold value. At acts **534***a*, **534***b*, and **534***c* the search window size and search offset values are communicated to UE **502**. In one aspect, IWS **508** communicates the offset values in the 1x UHDM along with assigned PN(s). At act **536**, UE **502** communicates with 1xBS **512** using the search offset in the UHDM according to 1x native operations.

FIG. **6** illustrates a detailed block diagram of inter RAT communications system **600**, such as IWS server **232** depicted in FIG. **2**. Inter RAT communications system **600** may include at least one of any type of hardware, server, personal computer, mini computer, mainframe computer, or any computing device either special purpose or general computing device. Further, the modules and applications described herein as being operated on or executed by content system **600** may be executed entirely on a single network device, as shown in FIG. **6**, or alternatively, in other aspects, separate servers, databases or computer devices may work in concert to provide data in usable formats to parties, and/or to provide a separate layer of control in the data flow between devices, such as UE **202**, mobile station **238**, etc., and the modules and applications executed by inter RAT communications system **600**.

Inter RAT communications system **600** includes computer platform **602** that can transmit and receive data across wired and wireless networks, and that can execute routines and applications. Computer platform **602** includes memory **604**, which may comprise volatile and nonvolatile memory such as read-only and/or random-access memory (ROM and RAM), EPROM, EEPROM, flash cards, or any memory common to computer platforms. Further, memory **604** may include one or more flash memory cells, or may be any secondary or tertiary storage device, such as magnetic media, optical media, tape, or soft or hard disk. Further, computer platform **602** also includes processor **630**, which may be an application-specific integrated circuit ("ASIC"), or other chipset, logic circuit, or other data processing device. Processor **630** may include various processing subsystems **632** embodied in hardware, firmware, software, and combinations thereof, that enable the functionality of inter RAT communications system **600** and the operability of the network device on a wired or wireless network.

In one aspect, processor **630** and/or communications module **650** may provide means for receiving a message including at least one measurement value for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE. Processor **630** and/or pilot search optimization module **610** may further provide means for selecting one or more parameters based on the at least one measurement value for the UE to use for pilot searching in the 1x network. Processor **630** and/or communications module **650** may further provide means for transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

Computer platform **602** further includes communications module **650** embodied in hardware, firmware, software, and combinations thereof, that enables communications among the various components of inter RAT communications system **600**, as well as between inter RAT communications system **600**, and UE **202**. Communication module **650** may include the requisite hardware, firmware, software and/or combinations thereof for establishing a wireless communication connection. According to described aspects, communication module **650** may include the necessary hardware, firmware and/or software to facilitate wireless and/or wireline communication between IWS **232** and UE **202**.

Memory **604** of inter RAT communications system **600** includes a pilot search optimization module **610** which may be operable optimize window size selection for inter RAT communications. In one aspect, inter RAT communications system **600** may include measurements reception module **612**, and window size selection module **616**. Window size selection module **614** may determine optimal parameters for pilot search for the UE. In one aspect, the parameters for pilot search may be window sizes for each available cell. In another aspect, the parameters for pilot search may be a pilot PN phase shift value for each available cell.

In one operational aspect, measurements reception module **612** may receive various measurements values from an eNBs. In one aspect, the eNB may store a window size value for each PN. The eNB may then set the maximum of the window sizes among stored PNs in the measurement object. In one aspect, if 1x pilot measurement is performed for 1xCSFB, the UE may send the 1x pilot measurement results in a Pilot List information element (IE). Measurements reception module **612** may receive the Pilot List IE in an uplink (UL) C2K Tunneling message through the MME. Such a message may include window sizes set based on stored information in eNB for each Pilot associated with reported PN in the Pilot List IE. Thereafter, when the inter RAT communications system **600** assigns a channel or channels, window size selection module **614** determines windows size based on the information provided by the eNB. The inter RAT communications system **600** communicates the window sizes (e.g., search window for active and candidate set, search window for neighbor set, search window for remaining set, etc.) in a 1x UHDM along with assigned PN(s). IN operation, the UE may use the values received in the UHDM according to 1x native operation.

In another operational aspect, when a 1x voice call is triggered (e.g., a mobile origination 1x call), a UE may perform an Extended Service Request. In such an operational aspect, the eNB may configure the measurement object to prompt the UE report both Pilot Strength and Pilot PN Phase in the measurement report. Measurements reception module **612** may at least a portion on the measured values. For example, when the eNB receives a UL handover Prep Transfer containing a GCSNA encapsulated 1x Origination Message, the eNB forwards and measurements reception module **612** receives the GCSNA encapsulated 1x Origination Message along with the measurement results (e.g., A21 Pilot List IE). In operation, an A21 Pilot List IE contains measured Pilot PN phase values for each PN. The window size selection module **614** may determine search offset values (e.g., SRCH_OFFSET) based on the reported Pilot PN Phase as appropriate. For example, a search offset value may set if the peak phase of measured pilot exceeds a threshold value. The inter RAT communications system **600** communicates a UHDM to the UE and the UE uses the search offset value (e.g., SRCH_OFFSET) as defined in 1x standard.

In another operational aspect, measurements reception module **612** may receive both search offset and search window sizes. In such an aspect, window size selection module **614** may determine parameters for pilot search based on both received values.

In another operational aspect, inter RAT communications system **600** communicates a general neighbor list message (GNLM) along with the UHDM to inform the UE of detailed

information related to search window size. In such an aspect, the combined GNLM and UHDM allows for efficient neighbor search by the UE. The information in a GNLM may be configured using the measurement results reported by eNB.

FIGS. **7** and **8** illustrate various methodologies in accordance with the claimed subject matter. While, for purposes of simplicity of explanation, the methodologies are shown and described as a series of acts, it is to be understood and appreciated that the claimed subject matter is not limited by the order of acts, as some acts may occur in different orders and/or concurrently with other acts from that shown and described herein. For example, those skilled in the art will understand and appreciate that a methodology could alternatively be represented as a series of interrelated states or events, such as in a state diagram. Moreover, not all illustrated acts may be required to implement a methodology in accordance with the claimed subject matter. Additionally, it should be further appreciated that the methodologies disclosed hereinafter and throughout this specification are capable of being stored on an article of manufacture to facilitate transporting and transferring such methodologies to computers. The term article of manufacture, as used herein, is intended to encompass a computer program accessible from any computer-readable device, carrier, or media.

FIG. **7** is a flow chart **700** of a method for determining optimal window size selection for a UE from an independent IWS.

Generally, an eNB may hold various parameters per PN, such as window size, and PN phase. In one aspect, the eNB may set the max of the window sizes among PNs in a measurement object. In another aspect, the eNB may configure the measurement object to make the UE report Pilot PN Phase in the measurement report. If 1x pilot measurement is performed by the UE for 1xCSFB, the UE sends the 1x pilot measurement results in the Pilot List information element.

At block **702**, the IWS receives measurement values for each PN measurement reported by the UE. In one aspect, the eNB sent UL C2K Tunneling message Pilot List IE is received by the IWS. In another aspect, the Pilot List IE includes the window size for each Pilot. In another aspect, the eNB forwards a GCSNA encapsulated 1x Origination Message along with the measurement results including the measured Pilot PN phase for each PN for reception by the IWS.

At block **704**, when the IWS selects parameters for pilot search for the UE based on the received measurement values. In one aspect, the IWS may assign a channel or channels, and determine parameters for use during 1x CSFB based on the information provided by the eNB. In another aspect, the IWS determines a search offset value (e.g., SRCH_OFFSET) based on the reported Pilot PN Phase as appropriate. For example, SRCH_OFFSET is set if the peak phase of measured pilot exceeds a threshold. In another aspect, the parameters for pilot search may be determined based on a combination of received search offset and window size values.

At block **706**, the IWS transmits the selected parameters for pilot search to the UE. In one aspect, the transmission may include any combination of window sizes (e.g., search window for active and candidate set, search window for neighbor set, search window for remaining set, etc.) and search offset values in the 1x UHDM along with assigned PN(s). The UE may use the received parameter(s) (e.g., Search Window Size, search offset) according to 1x native operation.

FIG. **8** is a flow chart **800** of a method for providing an independent IWS with optimal window sizes for a UE.

At block **802**, an eNB may store a search window size value which each of a plurality 1x pilot PNs. For example, an eNB may store search window size values for PN**1**, PN**2** and PN**3** as 1, 2, and 3 respectively. At block **804**, the eNB may determine a maximum search window size value of the stored search window size values. In the described example, the maximum search window size value may be 3. At block **806**, the eNB configures a measurement object to prompt a UE to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value. In the described example, when the eNB configures the measurement object, it uses 3 as a search window size and prompts the UE to measure PNs. At block **808**, the eNB transmits the measurement object to the UE. Thereafter, the UE may use search window size 3 for measurement for PNs. At block **810**, the eNB receives a measurement report e.g., including results for PN**1**, PN**2** and PN**3** from UE. At block **812**, the eNB generates and transmits a pilot list message and includes search window sizes based on the stored information (e.g., the Pilot List IE includes Pilot Strength for PN**1** with search window size 1, Pilot Strength for PN**2** with search window size 2 and Pilot Strength for PN**3** with search window size 3.)

FIG. **9** is a conceptual block diagram **900** illustrating the functionality of an exemplary apparatus **100**. The apparatus **100** includes a module **902** that receives a message including at least one measurement value **904** for each 1x pilot PN in a 1x network, obtained from measurements requested by an eNB and performed by a UE, a module **906** that selects one or more parameters **910** based on the at least one measurement value **904** for the UE to use for pilot searching in the 1x network, and a module **908** that transmits the selected one or more parameters for pilot search **910** to the UE for pilot searching in the 1x network. The apparatus **100** may include additional modules that perform each of the steps in the aforementioned flow charts. As such, each step in the aforementioned flow charts may be performed by a module and the apparatus **100** may include one or more of those modules.

In one configuration, the apparatus **100** for wireless communication includes means for selecting at least one of an optimal search window size or an optimal search offset value. The apparatus **100** for wireless communication further includes means for determining a search window size for each active and candidate 1x PN, means for determining a search window size for a neighbor set in the 1x network, and means for determining a search window for each remaining set in the 1x network. The apparatus **100** for wireless communication further includes means for determining that the at least one measurement value exceeds a threshold phase value, and means for determining the optimal search offset value based on a peak phase value of the at least one measurement value. The apparatus **100** for wireless communication further includes means for receiving the message using an uplink C2K tunneling message. In one configuration, the apparatus **100** for wireless communication further includes means for transmitting the selected one or more fallback values using a GCSNA (UHDM) message. In another configuration, the apparatus **100** for wireless communication further includes means for receiving the at least one measurement value using a pilot channel information element.

The aforementioned means may be one or more of the aforementioned modules of the apparatus **100** (see FIG. **6**) and/or the processing system **114** configured to perform the functions recited by the aforementioned means. As described supra, the processing system **114** includes processor **630**. As such, in one configuration, the aforementioned means may be the processor **630** configured to perform the functions recited by the aforementioned means.

FIG. **10** is a conceptual block diagram **1000** illustrating the functionality of an exemplary apparatus **100**. The apparatus **100** includes a module **1002** that receives and/or stores a

search window size values for each of a plurality of 1x pilot PNs **904**, a measurement object module **1006** that generates a measurement object using a maximum search window size value, and a transmission module **1008** that transmits the generated measurement object **1010** to the UE to prompt to the UE to perform measurements. The apparatus **100** may include additional modules that perform each of the steps in the aforementioned flow charts. As such, each step in the aforementioned flow charts may be performed by a module and the apparatus **100** may include one or more of those modules.

In one configuration, the apparatus **100** for wireless communication includes means for receiving a measurement report from the UE in response to the transmitted measurement object, wherein the measurement report includes a pilot strength value associated with each of the plurality of 1x pilot PNs, means for generating a pilot list message including the pilot strength values and the stored search window size values for each of the plurality of 1x pilot PNs, and means for transmitting the pilot list message to a IWS. The apparatus **100** for wireless communication further includes means for transmitting the pilot list message using an uplink C2K tunneling message.

The aforementioned means may be one or more of the aforementioned modules of the apparatus **100** (see FIG. **2**, eNodeB **206**) and/or the processing system **114** configured to perform the functions recited by the aforementioned means. As described supra, the processing system **114** includes eNodeB **206**. As such, in one configuration, the aforementioned means may be eNodeB **206** configured to perform the functions recited by the aforementioned means.

It is understood that the specific order or hierarchy of steps in the processes disclosed is an illustration of exemplary approaches. Based upon design preferences, it is understood that the specific order or hierarchy of steps in the processes may be rearranged. The accompanying method claims present elements of the various steps in a sample order, and are not meant to be limited to the specific order or hierarchy presented.

The previous description is provided to enable any person skilled in the art to practice the various aspects described herein. Various modifications to these aspects will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other aspects. Thus, the claims are not intended to be limited to the aspects shown herein, but is to be accorded the full scope consistent with the language claims, wherein reference to an element in the singular is not intended to mean "one and only one" unless specifically so stated, but rather "one or more." Unless specifically stated otherwise, the term "some" refers to one or more. All structural and functional equivalents to the elements of the various aspects described throughout this disclosure that are known or later come to be known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the claims. Moreover, nothing disclosed herein is intended to be dedicated to the public regardless of whether such disclosure is explicitly recited in the claims. No claim element is to be construed as a means plus function unless the element is expressly recited using the phrase "means for."

What is claimed is:

1. A method of wireless communications, comprising:

receiving, by an interworking solution (IWS) in a 1x network, a message from an evolved nodeB (eNB) in an Evolved Packet System (EPS) in response to a request to setup a handover, wherein the message including at least one measurement value for each 1x pilot pseudo-noise (PN) in the 1x network, obtained from measurements requested by the eNB and performed by a user equipment (UE);

communicating with a Mobile Switching Center (MSC) to setup the handover in response to receiving the message, wherein the communicating further includes:

transmitting a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN; and

receiving an assignment request message from the MSC in response to transmitting the service request message;

selecting one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network; and

transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

2. The method of claim **1**, wherein the at least one measurement value comprises at least one of:

a search window size for each 1x pilot PN; or

a pilot PN phase value, wherein the pilot PN phase value is used to determine a search offset window.

3. The method of claim **2**, wherein the search window size used for measurement is selected as a maximum search window size stored by the eNB.

4. The method of claim **1**, wherein the selecting further comprises selecting at least one of:

an optimal search window size; or

an optimal search offset value.

5. The method of claim **4**, wherein the selecting the optimal search window size further comprises:

determining a window size for each active and candidate 1x PN;

determining a search window size for a neighbor set in the 1x network; and

determining a search window for each remaining set in the 1x network.

6. The method of claim **4**, wherein the at least one measurement value is a pilot PN phase value, and wherein the selecting the optimal search offset value further comprises:

determining that the at least one measurement value exceeds a threshold phase value; and

determining the optimal search offset value based on a peak phase value of the at least one measurement value.

7. The method of claim **1**, wherein the receiving further comprises receiving the message using an uplink C2K tunneling message.

8. The method of claim **1**, wherein the transmitting further comprises transmitting the selected one or more parameters for pilot search using a handoff direction message.

9. The method of claim **8**, wherein the transmitting further comprises transmitting the selected one or more parameters for pilot search using a message for providing neighbor list with a handoff direction message.

10. The method of claim **1**, wherein the IWS and a base station are geographically separated entities.

11. The method of claim **1**, wherein the method comprises a circuit switched fallback (CSFB) procedure, and wherein the receiving further comprises receiving the at least one measurement value using a pilot channel information element.

12. The method of claim **1**, wherein the method comprises an evolved high rate packet data (eHRPD) optimized handover.

13. An apparatus for wireless communication, comprising:

means for receiving, a message from an evolved nodeB (eNB) in an Evolved Packet System (EPS) in response to

a request to setup a handover, at an interworking solution (IWS) in a 1x network, wherein the message including at least one measurement value for each 1x pilot PN in the 1x network, obtained from measurements requested by the eNB and performed by a user equipment (UE);

means for communicating with a Mobile Switching Center (MSC) to setup the handover in response to receiving the message, wherein the means for communicating further includes:

means for transmitting a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN; and

means for receiving an assignment request message from the MSC in response to transmitting the service request message;

means for selecting one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network; and

means for transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

14. A computer program product, comprising:

a non-transitory computer-readable medium comprising code for:

receiving, by an interworking solution (IWS) in a 1x network, a message from an evolved nodeB (eNB) in an Evolved Packet System (EPS) in response to a request to setup a handover, wherein the message including at least one measurement value for each 1x pilot PN in the 1x network, obtained from measurements requested by the eNB and performed by a user equipment (UE);

communicating with a Mobile Switching Center (MSC) to setup the handover in response to receiving the message, wherein the communicating further includes:

transmitting a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN; and

receiving an assignment request message from the MSC in response to transmitting the service request message;

selecting one or more parameters based on the at least one measurement value for the UE to use for pilot searching in the 1x network; and

transmitting the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

15. An apparatus for wireless communication, comprising:

a processing system configured to:

receive, by an interworking solution (IWS) in a 1x network, a message from an evolved nodeB (eNB) in an Evolved Packet System (EPS) in response to a request to setup a handover, wherein the message including at least one measurement value for each 1x pilot PN in the 1x network, obtained from measurements requested by the eNB and performed by a user equipment (UE);

communicate with a Mobile Switching Center (MSC) to setup the handover in response to receiving the message, wherein the processing system is further configured to:

transmit a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN; and

receive an assignment request message from the MSC in response to transmitting the service request message;

select one or more parameters for pilot search based on the at least one measurement value for the UE to use for pilot searching in the 1x network; and

transmit the selected one or more parameters for pilot search to the UE for pilot searching in the 1x network.

16. The apparatus of claim **15**, wherein the at least one measurement value comprises at least one of:

a search window size for each 1x pilot PN; or

a pilot PN phase value, wherein the pilot PN phase value is used to determine a search offset window.

17. The apparatus of claim **16**, wherein the search window size used for measurement is selected as a maximum search window size stored by the eNB.

18. The apparatus of claim **15**, wherein the processing system is further configured to select at least one of:

an optimal search window size; or

an optimal search offset value.

19. The apparatus of claim **15**, wherein the processing system is further configured to:

determine a window size for each active and candidate 1x PN;

determine a search window size for a neighbor set in the 1x network; and

determine a search window for each remaining set in the 1x network.

20. The apparatus of claim **15**, wherein the at least one measurement value is a pilot PN phase value, and wherein the processing system is further configured to:

determine that the at least one measurement value exceeds a threshold phase value; and

determine the optimal search offset value based on a peak phase value of the at least one measurement value.

21. The apparatus of claim **15**, wherein the wherein the processing system is further configured to receive the message using an uplink C2K tunneling message.

22. The apparatus of claim **15**, wherein the processing system is further configured to transmit the selected one or more parameters for pilot search using a handoff direction message.

23. The apparatus of claim **22**, wherein the processing system is further configured to transmit the selected one or more parameters for pilot search using a message for providing neighbor list with a handoff direction message.

24. The apparatus of claim **15**, wherein the IWS and a base station are geographically separated entities.

25. The apparatus of claim **15**, wherein the apparatus is operable to perform a CSFB procedure, and wherein the processing system is further configured to receive the at least one measurement value using a pilot channel information element.

26. The apparatus of claim **15**, wherein the apparatus is operable to perform an eHRPD optimized handover.

27. A method of wireless communications, comprising:

storing, by an evolved nodeB (eNB), a plurality of search window size values that each correspond to one of a plurality 1x pilot PNs;

determining a maximum search window size value from the plurality of stored search window size values;

configuring a measurement object to prompt a user equipment (UE) to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value; and

transmitting a handover preparation request comprising the measurement object to the UE, wherein the handover preparation request causes an interworking solution (IWS) to communicate with a Mobile Switching Center (MSC) to setup a handover, wherein the handover prepa-

ration request further causes the IWS to transmit a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN and receive an assignment request message from the MSC in response to transmitting the service request message.

28. The method of claim **27**, further comprising:

receiving a measurement report from the UE in response to the transmitted measurement object, wherein the measurement report includes a pilot strength value associated with each of the plurality of 1x pilot PNs;

generating a pilot list message including the pilot strength values and the stored search window size values for each of the plurality of 1x pilot PNs; and

transmitting the pilot list message to the IWS.

29. The method of claim **28**, wherein the transmitting further comprises transmitting the pilot list message using an uplink C2K tunneling message.

30. An apparatus for wireless communication, comprising:

means for storing, a plurality of search window size values at an evolved nodeB (eNB), wherein the plurality of search window size values each correspond to one of a plurality 1x pilot PNs;

means for determining a maximum search window size value from the plurality of stored search window size values;

means for configuring a measurement object to prompt a user equipment (UE) to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value; and

means for transmitting a handover preparation request comprising the measurement object to the UE, wherein the handover preparation request causes an interworking solution (IWS) to communicate with a Mobile Switching Center (MSC) to setup a handover, wherein the handover preparation request further causes the IWS to transmit a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN and receive an assignment request message from the MSC in response to transmitting the service request message.

31. A computer program product, comprising:

a non-transitory computer-readable medium comprising code for:

storing, by an evolved nodeB (eNB), a plurality of search window size values that each correspond to one of a plurality 1x pilot PNs;

determining a maximum search window size value from the plurality of stored search window size values;

configuring a measurement object to prompt a user equipment (UE) to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value; and

transmitting a handover preparation request comprising the measurement object to the UE, wherein the handover preparation request causes an interworking solution (IWS) to communicate with a Mobile Switching Center (MSC) to setup a handover, wherein the handover preparation request further causes the IWS to transmit a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN and receive an assignment request message from the MSC in response to transmitting the service request message.

32. An apparatus for wireless communication, comprising:

a processing system configured to:

store, by an evolved nodeB (eNB), a plurality of search window size values that each correspond to one of a plurality 1x pilot PNs;

determine a maximum search window size value from the plurality of stored search window size values;

configure a measurement object to prompt a user equipment (UE) to perform measurements for the plurality of 1x pilot PNs using the maximum search window size value; and

transmit a handover preparation request comprising the measurement object to the UE, wherein the handover preparation request causes an interworking solution (IWS) to communicate with a Mobile Switching Center (MSC) to setup a handover, wherein the handover preparation request further causes the IWS to transmit a service request message to the MSC in response to receiving the message including the at least one measurement value for each 1x pilot PN and receive an assignment request message from the MSC in response to transmitting the service request message.

33. The apparatus of claim **32**, wherein the processing system is further configured to:

receive a measurement report from the UE in response to the transmitted measurement object, wherein the measurement report includes a pilot strength value associated with each of the plurality of 1x pilot PNs; and

generate a pilot list message including the pilot strength values and the stored search window size values for each of the plurality of 1x pilot PNs; and

transmit the pilot list message to the IWS.

34. The apparatus of claim **33**, wherein the processing system is further configured to transmit the pilot list message using an uplink C2K tunneling message.

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